EXHIBIT B

SOUTH ESSEX ENGINEERING, P.C.

Engineering Consultant

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April 28, 2003

Imperial, Zazzaro & Calabro, P.A.
499 Bloomfield Avenue
Montclair, New Jersey 07042

COPY

Attention: Robert Wilner

Re: Deshaw Young
South Essex Engineering File No.:1339-03

Dear Mr. Wilner:

In accordance with your request, file material pertinent to the captioned matter has been reviewed. In addition, on March 14, 2003, an inspection of the clothes washer/extractor involved in the death of the captioned party was conducted at the police property vault, Newark, New Jersey. Photographs, numbered 1 through 68, taken during the inspection are included here and are part of this report.

The following documents, texts, and standards were also reviewed:

- SP-586, Product Liability and Quality
- ANSI Z 535 Product Safety Signs and Labeling
- Safety Brief, Volume 7, No. 3, June 1992, SAFETY INTERLOCKS - THE DARK SIDE, Triodyne, Inc.
- Underwriter's Laboratories Information
- Standard Handbook of Machine Design, Second Edition, McGraw Hill
- ANSI/ASME B15.1 - 1984
- ANSI Z8.1 - 1990, American National Standard for Commercial Laundry and Drycleaning Operations - Safety Requirements
- ANSI/UL 2157 - 1995
- OSHA, CFR 29

The inspected incident equipment was identified as a top loading clothes washer, Model Number FWX233RES4, manufactured for Frigidaire CO., Augusta, Georgia. The housing, which fully enclosed the machine, was constructed of formed sheet metal and measured 39-9/16 inches high from the floor to the loading surface of the machine; 26 inches deep, front to back; and 27

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inches wide, side to side. A 6-1/4 inch high control panel was mounted from side to side along the back-most part of the top surface of the machine.

A rectangular lid 19-3/4 inches wide, side to side, by 16-1/8 inches from front to back was fitted flush into the top of the machine. The lid opened upward at the front of the machine and rotated on hinges toward the rear of the machine.

These hinges were of a pin type design and were formed of wire and screw-fastened at the opposite corners on a long edge of the lid. The wire was formed into a pin which extended laterally from the left and right sides of the lid at the corners. Each pin was received by a hole formed into the rear corner of the lid recess of the washer-top sheetmetal.

When raised to the past-vertical open position, this cover exposed a 16-7/8 inch diameter horizontal access opening to an interior washer drum. This drum incorporated at its center a agitator with a capped, vertically-positioned, spindle stem. The apex of this stem was measured to be positioned 3-1/4 inches below the top exterior surface of the machine. The cap-piece of this spindle stem was smooth, round and measured 2-1/4 inches in horizontal diameter. The center of this cap was positioned at about 13-1/2 inches from the machine sides which was about the midpoint from side to side of the machine and about 13-13/16 from the front of the machine.

The machine was electrically powered and operated through a control system and motor driven transmission which in one mode provided slow speed reciprocating operation of the referenced agitator about its spindle axis. A second mode provided for the high speed continuous, unidirectional, rotation of the drum and agitator as a unit about the same axis to provide for the separation of the water from the wash load through the effects of centrifugal force on the water in the common manner of an extractor.

An extractor is a centrifuge which rotates at high speed to a velocity sufficient to pull the majority of a liquid from a saturated base such as fabric. The control system of the machine incorporated a mechanically operated switch-energized electrical circuit provision, an interlock, which was intended to prevent the extractor function from coming into operation unless and until the machine cover was in the closed position and flush with the top of the machine.

The switch part of the referenced circuit was located inside the machine housing below the cover-recess area. External access to this switch was provided through a rectangular opening cut into the sheet metal of this recessed area immediately above the position of the switch. The short side of this rectangle was oriented parallel to the front and back of the machine and measured about 0.369 inches in width. The long side of the opening was

oriented parallel to the sides of the machine and measured about 1.641 inches in length.

The front and right edges of this opening were respectively measured to be 4 -13/16 inches from the front of the machine and 3 -13/16 inches from the right side of the machine. It was found that an object such as a ball-point pen could be used to activate the subject switch by passing it through the access opening and pressing the switch operator.

It was determined that the switch operator was positioned at 0.538 inches below the upper surface of the sheetmetal around the access opening when relaxed and if depressed to 0.704 inches the switch was operated and caused to allow the extractor or spin cycle to operate with the lid open.

When the lid of the machine was closed, a mechanism incorporated on the underside of the lid passed into and through the rectangular external access opening and contacted the referenced switch operator causing the switch to function and allow the extractor cycle of the machine to be energized when initiated in turn by the machine control system.

The referenced mechanism was formed of plastic and was attached to the underside of the right side of the lid by two screw-type fasteners and was positioned so as to be aligned with the rectangular switch-access opening in the sheet metal of the washer. The switch operator was formed with an opening at its center which enabled it to be tasked to perform a second concurrent function to that of operating the switch. When in a spin or extractor portion of an operating cycle, a mechanical latching device was caused to operate and engage the opening in the plastic switch operator such that the lid was locked closed.

Interestingly, a common 25 cent piece was measured and found to be about 15/16th or 0.950 inches in diameter. A Pilot brand ball-point pen was measured to be 0.330 inches in diameter while the cap of this pen measured 0.420 inches wide at its maximum. A Papermate brand ball-point pen was measured to be 0.298 inches in diameter. A Bic brand promotional-quality ball-point pen measured about 0.318 inches in width while its cap measured 0.410 at its maximum diameter. Each of these objects, as well as many others, could be passed through the access opening and potentially be used to operate the subject switch. It was evident that the purpose of the subject switch could be easily defeated being that it was unprotected and accessible and evidently could foreseeably be caused to operate by many common and available objects even in the hands of a child.

It is understood that on January 26, 2003, Deshaw Young was at his home at 130 ½ Broad Street, Newark, New Jersey and was in the basement at a

point in time utilizing the subject washing machine. Reportedly at some later time, Deshaw Young was found with his exposed right arm, and his head positioned inside of the drum at the top of the machine through the open lid space.

It was also reported that the long sleeved sweater he was still partially wearing was no longer fitted about his right arm and that the fabric of the sweater was engaged about the stem of the agitator of the washer at one end and twisted to and tightly around his neck at the other. Deshaw Young was evidently strangled as a result of this involvement of his sweater with the rotating spindle stem of the machine.

During the inspection while the machine was operating in the washing mode, the agitator was observed to index from reciprocation to reciprocation such that the agitator would actually revolve through a full turn and continue on. Over a measured time of 28 second, the agitator made 5 full revolutions. This rotating action was incremental and slow and unlikely to have engaged the sweater of the victim without his having been able to respond effectively.

It was noted during the inspection that the right front side of the sheet metal which formed the top of the machine had been partially opened and separated at its assembly points with the side paneling of the machine such that a physical opening and viewable access was presented into the underside of the top sheetmetal in the area of the cover latch device and referenced switch. This condition was unaccounted for and if this condition was produced by some inspecting party they failed to restore the machine to the condition it otherwise would have been in at the time of the subject event.

As inspected and while in operation, the subject washing machine performed as designed. The extractor cycle would not function unless the cover was in the closed position. When in the extractor cycle, the cover latching system was engaged preventing the cover from being opened. The agitator and pump systems worked effectively and no malfunctions were noted in the machine as a whole.

The drum and spindle were guarded by the referenced cover in conjunction with the noted interlock system. Removing or defeating one or the other of these components exposed the user of the machine to the significant hazard formed by the spindle and by the drum when they were rotating at speed.

When the interlock switch was manually activated by a suitable object inserted through the referenced access opening in the sheet metal, the machine performed as though the cover was closed and the cover latch was engaged even though the cover was fully open. There were no redundant safety features related to the prevention of exposure of the user to the spin-cycle drum hazard.

The cover latching mechanism had no feedback or signaling feature to indicate that the cover was not in the closed position. No text was observed on the machine or around the switch-access opening notifying a reader of any hazard associated with the opening or any portion thereof.

With the lid open and the switch manually activated, the undersigned conducted a test to ascertain the reaction of a piece of dry clothing, a sweat shirt, to the rotation of the spindle stem while the machine was operating in the extractor or spin cycle. It was found that the shirt would become entwined about the spindle, cause the shirt to become twisted, from the spindle end to the restrained end, and that the high speed rotary forces gathered the shirt instantly to and about the spindle when the spindle top gained a full wrap of the material. The speed with which this action took place was not measurable by ordinary means, and was observed to be so rapid as to preclude any physical reaction on this writer's part. This action, being extremely rapid, it was unlikely that any person could initiate a meaningful counter-action to such an event.

The coast-down time of the drum and spindle from the top speed observed when the machine was in the spin cycle was measured under two conditions: First, with the drum empty and second, with a load of wet clothing in the drum. Remarkably, both these readings were substantial in elapsed time and found to be essentially the same at about 25-3/4 seconds. There was no identified mechanism designed into the machine intended to curtail this free-running coast down.

From this it was evident that the drum system was probably artificially weighted by design to aid in balancing the inevitable eccentricity commonly found in an everyday wash load. This added weighting of the drum probably accounted for the 25 second coast down period as a result of the increased stored inertial energy in the speeding drum assembly. In addition, it is important to note that the agitator spindle was of a small radius and with respect to the mass and radius of the spinning drum formed a pinion which was possessed of significant mechanical advantage to pull on any fabric once becoming wrapped about its circumference. In this instance, there was both speed and power over a significant period of time available in the subject hazard.

With the lid open, the spinning drum therefore continued to be dangerous with the power cut off from full speed due to the significant stored energy in the rotating drum system. Hypothetically, this indicates that if the drum was run up to speed with the cover open and then the power was removed an individual attempting to manually slow the drum would be exposed to significant danger of injury or death despite the power having been removed from the drum system.

An exposed individual who's clothing had become involved with the spindle would have no time to react in a meaningful manner. Such a person had

they activated the subject switch in order to enable the initiation of the extraction or so-called spin cycle could not improve the dangerous nature of the situation by intentionally or inadvertently removing the selected object from contact with the referenced switch. When an individual is exposed to involvement, stored energy such as that in the subject drum system when spinning at high speed is well known in industry as representing a serious hazard. Such hazards are well recognized by groups including, design engineers, safety professionals, and OSHA as sufficient to cause severe injury or death.

It was also determined that there was no active provision, such as a brake, incorporated in the machine to expedite slowing of the rotating mass of the drum and spindle. Such a device had the potential to greatly reduce the magnitude of the hazard and could have reduced the severity of the injuries to the subject victim. The reaction of the drum at speed to the interruption of driving power was the same whether the manual activation of the switch was discontinued or the machine control was shut off.

The text of ANSI/ASME Standard B15.1, 1984, titled, Safety Standard for Mechanical Power Transmission Apparatus, reads, in part, as follows:

Part 1.2 Purpose. "The purpose of this Standard is to provide requirements for use in developing effective safeguarding methods to protect people from injury due to inadvertent contact with mechanical power transmission apparatus. ...."

ANSI B15.1 further indicated that safeguarding methods are intended to provide protection from inadvertent contact. This standard also provided the definition for "inadvertent contact" which was: "When a person touches or otherwise contacts mechanical power transmission apparatus accidentally." It was noted that, inadvertently, unintentionally, not purposely, and involuntarily are each synonyms for accidentally.

Based upon the file materials, standards and references reviewed, the March 14, 2003, site inspection, the writer's education, engineering, design, manufacturing, management, maintenance training, and experience, and the foregoing, the writer's opinions to a reasonable degree of engineering certainty are as follows:

•The spinning drum and spindle of the subject washer represented a power transmission apparatus because they imparted significant energy and power to the wash load of water and clothing. As a result, they were required to be properly guarded according to ANSI/ASME Standard B15.1, 1984, titled, Safety Standard for Mechanical Power Transmission Apparatus. This standard reads in section 3, subsection 3.1, General Requirements: "All motion hazards associated with the operation of mechanical power transmission apparatus shall

be eliminated by design of the equipment or protection by guard, device, safe distance, or safe location."

•The guarding system provided was inadequate to protect the user from the power transmission apparatus represented by the spinning drum and spindle of the subject washer.

•An essential requirement of an interlock is that it be so arranged as to cause it to be reasonably difficult to bypass or defeat by those it is intended to serve.

•The subject interlock was not significantly difficult to bypass and defeat.

•The subject machine was provided with a defectively designed interlock.

•The subject interlock was an indispensable part of the guarding system for the drum and spindle of the subject washer.

•The defective interlock system resulted in a product which was unreasonably hazardous to the user. This hazard significantly contributed to the happening of the subject event.

•The round apex of the agitator spindle was inadequate in diameter to reasonably inhibit the gathering of a person's clothing about its circumference. A larger cap on the spindle would have been more resistant to locking fabric about its circumference because more than a full wrap of material is required before the material becomes locked around a smooth rotating object such as the subject spindle. The reason for this is that the larger the diameter, the greater is the circumference and consequently more length of material would have to be gathered to wrap all the way around the spindle to a point of being captured under the in-feeding fabric.

•The external access opening was placed in an area of easy access to a machine user.

•The interlock switch was conveniently accessible through the external access opening in the top of the washer.

•The external access opening was excessively large, and increased the range of potential objects which would fit into and activate the interlock switch.

•Sensing the position of the drum lid should have been a key requirement of a design to ensuring that the lid was in the closed position and that therefore it was safe for the spin cycle to be powered. This was not achieved by the designer of this machine. The subject design sensed only that the interlock

switch was triggered which, as a result of faulty interlock design logic, did not establish the actual requirement of the design which was: what is the position of the drum lid, closed or not closed. This faulty design logic produced a product which incorporated a significant hazard which significantly contributed to the happening of the subject event.

•The designer of the subject machine failed to provide a redundant, fail safe, design. Only one level of control was provided for activating the interlock. A second level could have stymied an attempt to defeat the purpose of the subject interlock.

•The electrical circuit interlock control mechanism of the power to the drum and spindle was not incorporated as part of the door design and therefore did not monitor the position of the lid: closed or not closed.

•The designer's of the machine relied on a secondary indicator, the switch under the top of the washer, to "prove" that the lid was in the closed position. This was a fallacious concept because this switch had no reliable way of monitoring the position that the lid was in, open or closed, because it was subject to operation by many other means not only engagement by the plastic operator when the lid was placed in the closed position.

•Had the position of the lid been directly monitored as opposed to the indirect arrangement utilized, the fidelity of the interlocking control system would have been significantly improved and the subject event would have, in all reasonable engineering probability, been prevented.

•There was nothing about the external access opening at the switch which could be interpreted as being intended to prevent the insertion and utilization of a common, ready made, foreign object to defeat the switch purpose.

•The interlock was easily defeated in a single-step process by simply inserting a suitable object, such as noted above, through the excessively large and oversized access opening.

•There was nothing enigmatic about the physical design of the interlock. It was, to anyone with a child's curiosity, obvious from the presence of the switch operator on the lid that a substitute object could reasonably be used to, with the lid open, trigger the interlock switch through the cutout in the machine cover.

•It was foreseeable and those responsible for this product knew or should have known that the employed interlock system was defective because it could easily be defeated, even a child could do it.

•The nature of the defect caused the complete failure of the interlock and thus the defeat of the safety system. This defective and hazardous design was significantly responsible for the happening of the subject accident.

• Absent any facts to the contrary, the subject child evidently defeated the interlock in a manner similar to that outlined above. This type event was foreseeable to the designers of the subject machine based on the characteristics of the design reviewed above.

•Other design concepts were available or easily conceived which would have significantly reduced or eliminated the probability that the interlock and safety system would be defeated by a user, including a child.

•The subject defective interlock arrangement should not have been selected. Sound logic should have been employed with respect to the engineering problem of an interlock for the subject guard, the lid.

It is the writer's concluding opinion that the inspected machine was of inadequate design and, as manufactured, not in accordance with recognized and established engineering practice, and it was unreasonably hazardous for the intended consumer use and lacked certain features required for its safe operation including appropriate and adequate warnings related to the interlock design utilized.

This is an initial report and additional information may become available. Should additional information become available in the future, a supplement to this report may then be indicated. In the interim, if further assistance is required or questions arise, please contact the undersigned at your convenience. Thank you.

Very truly yours,

John Jones Jr., PE
Engineering Consultant

SOUTH ESSEX ENGINEERING

Engineering Consultants

13 S. Burgee Dr. Little Egg Harbor, New Jersey 08087

CELL PHONE: 609 - 713 - 1878

April 12, 2006

Law Offices of
Frank Zazzaro
39 S. Fullerton Avenue
Montclair, New Jersey 07042

Attention: Frank Zazzaro, Esq.

Re: Deshaw Young
South Essex Engineering File No.:1339-03

Dear Mr. Zazzaro:

In accordance with your request, supplemental file material pertinent to the captioned matter was reviewed and compared to the original file material. Prior to drafting the report of April 28, 2003, the writer conducted a comprehensive study of this washing machine design including the mechanical, electrical, and control system. The extensive engineering, machine design, electrical, safety interlock, machine control systems, and warning design experience was relied on by the undersigned for this study.

The following file documents, texts, and standards were again reviewed:

- SP-586, Product Liability and Quality
- ANSI Z 535 Product Safety Signs and Labeling
- Safety Brief, Volume 7, No. 3, June 1992, SAFETY INTERLOCKS - THE DARK SIDE, Triodyne, Inc.
- Underwriter's Laboratories Information
- Standard Handbook of Machine Design, Second Edition, McGraw Hill
- ANSI/ASME B15.1 – 1984 and B15.1a - 1986
- ANSI Z8.1 - 1990, American National Standard for Commercial Laundry and Drycleaning Operations - Safety Requirements
- ANSI/UL 2157 - 1995
- OSHA, CFR 29

In addition to the initial South Essex Engineering report dated April 28, 2003, the following supplemental file materials and references were reviewed:

- Correspondence
- Underwriters Laboratory, STANDARD for SAFETY ELECTRIC HOME LAUNDRY

EQUIPMENT, UL 560: dated: 1955, 1961, 1968, 1969, 1971, 1972, 1975, 1980, 1986, and 1997.

- Daniel S. Burdett Report, Re.: Christopher Montell
- Fred J. Pauk, Electrolux, Investigative Report dated: February 17, 2004, Re.: Montell
- Deposition transcript of Fred Pauk, dated: March 8, 2004, Re.: Muntell
- Letter to CPSC, V. V. Ceasar, with cc: R. Newcomb, by L. K. Eyerman, dated: July 2, 2001, Re.:" Epidemiological Investigation Report Number 98716CCC6909, Re.: Newcomb
- Letter to CPSC, V. V. Ceasar, by H. E. Buckles, dated: June 19, 2001, Re.: 980716CCC6909, Re.: Newcomb
- Epidemiology Report, Case No.:980716CCC6909, dated: 7/22/98, Re.: Newcomb
- Hayes & Associates, Inc. Report, Re.: Newcomb, dated: October 5, 2001, By, W. C. Hayes
- CASE SUMMARY, Re. Amber Newcomb, & CPSC, EIR98716CCC6909
- EMS Report, Re.: Newcomb, dated June 24, 2001
- Deposition Transcript excerpts of David Modtland, Re.: Newcomb, dated: November13, 2000
- BIMETAL ACTUATED LOCK Patent No.: 4,718,705
- Deposition Transcript excerpts of Robert Baker, Re.: Newcomb, dated: may 17, 2001
- Newcomb medical material
- J.F. Shelley Report dated: December 11, 1999 Re.: Shane Carpenter;
- Appendix A, Installation Instructions;
- Appendix B, Owner's Guide; Appendix C, Operating Instructions;
- Appendix D, "Before Calling for Service" Brochure;
- Appendix E, Photographs Taken During Inspection; DEF 001264 through DEF 00107, photocopies of Shelley Report photographs;
- Shelley Resume;
- Pauk Deposition Transcript dated September 18, 2002, Re.: Shane Carpenter;
- Pauk Continued Deposition Transcript dated: November 16, 2005, Re.: Shane Carpenter;
- CPSC Report No.: 030127CNE7751 (Young), dated 01/30/03;
- MEI-CHARLTON, INC. Report by: Robert Hodel, PE, dated: August 16, 1999, Re.: Newcomb;
- Newark Police Report dated: 1/26/03, Re.: Young;
- Pauk Deposition Transcript Dated December 15, 2005, Re.: Young;
- File of Medical Examiner's Report, Washing Machine details, Investigative photograph photocopies, Re.: Young;
- Electrolux's answers to Form C and C (4) Interrogatories;
- U. S. CONSUMMER PRODUCTS SAFETY COMMISSION Washing Machine Incident Report by Mechanical Engineer Troy Whitfield, Division Of Mechanical Engineering, Re.: Young;
- INTERNATIONAL STANDARD, FORMAL DESIGN REVIEW, CEI IEC 1160, dated: 1992;

- Plaintiff RUSSEL BLUM Documents, dated: Circa 1985, Lost Finger;
- Joanne Johnson Documents, dated: Circa 1986;
- Hilda Exclusa Documents, dated: Circa 1997;
- Tommy Jean Vaughn Documents, dated: Circa 1999;
- Pamela Lewis Documents, dated: Circa 1999;
- Randy LaBlanc Documents, dated Circa 2001;
- Suzanne Arnold Documents, dated Circa 2000;
- Christopher Montell Documents, dated Circa 2003, including Deposition transcript of Fred Pauk, dated March 8 2004;
- Letter by George Maher dated: September 19, 2002 (2 fingers);
- Marie Marchais Documents, dated Circa 2004;
- Paula Gibson Documents dated: Circa 2003.
- ENGINEERING DESIGN for SAFETY by Hunter, McGraw Hill
- DESIGN PARADIGMS by Petroski, Cambridge
- TO ENGINEER IS HUMAN by Petroski, Vintage
- PRODUCT SAFETY LABEL HANDBOOK, "DANGER WARNING CAUTION" by Westinghouse Electric Corporation, 1985
- ACCIDENT PREVENTION MANUAL, National Safety Council, 10th Ed.

Certain terms used in the following report are explained or otherwise defined below:

From the referenced texts above and other resources, the conventionally accepted relationship between, and an understanding of: *Risk, Hazard, and Danger* were reviewed. Simply written, a Hazard produces Risk. Risk is the probability of injury and is affected by proximity, among other factors. Danger is the product of the combination of one or more hazards with the circumstance, Risk. (See: STANDARD HANDBOOK of MACHINE DESIGN, 2nd Ed. Chapter 10; SAFETY).

Government regulations -- OSHA refers to certain standards for much of the source material, and by legislation they in effect receive the weight of law.

Consensus Standards – Minimum level of design or performance acceptance.

From the B 15.1 Standard: "*Shall* – to be understood as mandatory;" "*Mechanical power transmission apparatus* – the mechanical components which, together with a source of power, provide the motion to an element of a machine or equipment;" *"Motion Hazard* – hazards created by movement of components of power transmission apparatus either by themselves or in relation to other components or fixed structures."

"A *product defect* is a characteristic of a product that makes it substandard. These characteristics, in a legal sense, lead to conditions under which a product is unreasonably dangerous or hazardous when used in certain expected or foreseeable ways." "*Warning* defects occur when proper warnings are not presented at hazardous locations, thus creating a defect. The warning may be absent, insufficient in extent, unreadable, unclear, or inadequate." "*Design defects* occur when a product is manufactured to the designer's drawings and specifications and functions as intended by the designer and manufacturer but is alleged to be unreasonably hazardous when used in an expected or foreseeable manner." "The *consumer expectation test* used is based on the idea that consumers expect products to operate reliably and predictably and that if the products fail, the failure will not cause harm. The risk-benefit or risk-utility analysis

assumes that all factors involved in designing the product were included and evaluated in arriving at the final design chosen; thus there are no better ways of designing and manufacturing the product to accomplish its intended purposes." (See: STANDARD HANDBOOK of MACHINE DESIGN, 2nd Ed. Chapter 1; SAFETY).

For reference, portions of the April 28, 2003 initial Report regarding the incident Washing Machine with Serial Number: XC04603122, are set down below:

> The inspected incident equipment was identified as a top loading clothes washer, Model Number FWX233RES4, manufactured for Frigidaire CO., Augusta, Georgia. The housing, which fully enclosed the machine, was constructed of formed sheet metal and measured 39-9/16 inches high from the floor to the loading surface of the machine; 26 inches deep, front to back; and 27 inches wide, side to side. A 6-1/4 inch high control panel was mounted from side to side along the back-most part of the top surface of the machine.
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> A rectangular lid 19-3/4 inches wide, side to side, by 16-1/8 inches from front to back was fitted flush into the top of the machine. The lid opened upward at the front of the machine and rotated on hinges toward the rear of the machine.
>
> These hinges were of a pin type design and were formed of wire and screw-fastened at the opposite corners on a long edge of the lid. The wire was formed into a pin which extended laterally from the left and right sides of the lid at the corners. Each pin was received by a hole formed into the rear corner of the lid recess of the washer-top sheetmetal.
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> When raised to the past-vertical open position, this cover exposed a 16-7/8 inch diameter horizontal access opening to an interior washer drum. This drum incorporated at its center an agitator with a capped, vertically-positioned, spindle stem. The apex of this stem was measured to be positioned 3-1/4 inches below the top exterior surface of the machine. The cap-piece of this spindle stem was smooth, round and measured 2-1/4 inches in horizontal diameter. The center of this cap was positioned at about 13-1/2 inches from the machine sides which was about the midpoint from side to side of the machine and about 13-13/16 from the front of the machine.
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> The machine was electrically powered and operated through a control system and motor driven transmission which in one mode provided slow speed reciprocating operation of the referenced agitator about its spindle axis. A second mode provided for the high speed continuous, unidirectional, rotation of the drum and agitator as a unit about the same axis to provide for the separation of the water from the wash load through the effects of centrifugal force on the water in the

common manner of an extractor.

An extractor is a centrifuge which rotates at high speed to a velocity sufficient to pull the majority of a liquid from a saturated base such as fabric. The control system of the machine incorporated a mechanically operated switch-energized electrical circuit provision, an interlock, which was intended to prevent the extractor function from coming into operation unless and until the machine cover was in the closed position and flush with the top of the machine.

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It was determined that the switch operator was positioned at 0.538 inches below the upper surface of the sheetmetal around the access opening when relaxed and if depressed to 0.704 inches the switch was operated and caused to allow the extractor or spin cycle to operate with the lid open.

When the lid of the machine was closed, a mechanism incorporated on the underside of the lid passed into and through the rectangular external access opening and contacted the referenced switch operator causing the switch to function and allow the extractor cycle of the machine to be energized when initiated in turn by the machine control system.

The referenced mechanism was formed of plastic and was attached to the underside of the right side of the lid by two screw-type fasteners and was positioned so as to be aligned with the rectangular switch-access opening in the sheet metal of the washer. The switch operator was formed with an opening at its center which enabled it to be tasked to perform a second concurrent function to that of operating the switch. When in a spin or extractor portion of an operating cycle, a

mechanical latching device was caused to operate and engage the opening in the plastic switch operator such that the lid was locked closed.

Interestingly, a common 25 cent piece was measured and found to be about 15/16th or 0.950 inches in diameter. A Pilot brand ball-point pen was measured to be 0.330 inches in diameter while the cap of this pen measured 0.420 inches wide at its maximum. A Papermate brand ball-point pen was measured to be 0.298 inches in diameter. A Bic brand promotional-quality ball-point pen measured about 0.318 inches in width while its cap measured 0.410 at its maximum diameter. Each of these objects, as well as many others, could be passed through the access opening and potentially be used to operate the subject switch. It was evident that the purpose of the subject switch could be easily defeated being that it was unprotected and accessible and evidently could foreseeably be caused to operate by many common and available objects.

The following was contained in the referenced WESTINGHOUSE, PRODUCT SAFETY LABEL HANDBOOK: The table of Contents included the following sections, among others:

1. Why a safety Label Program was Developed
2. Labels and the Law
3. Existing standards
4. Anatomy of a Label
5. Examples
6. How to Look for Hazards
7. How to Select the Correct Signal word
8. How to Develop Appropriate Labels
9. How to Determine Where Labels are Placed
10. How to Write a Safety Label

On page two of this Handbook item (1.) was addressed, and in part contained the following: "Experience has shown that, geography, and the complex organizational structure of most companies make centralized label design impossible. In addition, each product usually requires special attention, and demands a unique safety label."

"There are many industry and government standards and guidelines for safety labels. This Handbook attempts to make it easier for product designers to comply with these standards and to exceed them when practical. In addition, it should raise people's awareness of the importance of safety labels."

On page four of this Handbook item (2.) was addressed, and in part contained the following: "(Duty to warn) -- A product is defective if it is considered to be unreasonably dangerous. There are three basic ways a manufacturer can make a dangerous product: 1. Defective design; 2. Defective manufacturing; 3. Failure to adequately warn of hazards." The text continued further on: "The law says that warnings must be provided if all of the following four conditions exist: 1.The product is hazardous. 2. The manufacturer

knows or should know that the product is hazardous. 3. The hazard is not obvious or readily discoverable by the user. 4. The hazard will exist during foreseeable use or misuse."

Continuing on page five: "(Adequacy of warning) – Courts have judged the adequacy of labels according to the circumstances of the particular user and the environment. Labels should be understandable by the intended audience---even if they are illiterate." "(Post sale duty to warn) – If a hazard is discovered after a product is sold, the manufacturer should consider informing product users or other appropriate persons about the risk. In some cases the product may have to be modified. In other cases it may be advisable to create a safety label. If hazards are discovered after a product has been sold, contact the Corporate Law Department to discuss the recommended action."

On page six of this Handbook the above item (3.) was addressed, and in part contained the following: "There are many existing standards dealing with product safety labels. Although they differ slightly in approach, the intent of all of them is the same---to help manufacturers provide adequate warnings of potential hazards." "Some standards are very specific; others are more general. Most deal primarily with format and don't discuss hazard analysis and label writing in much detail."

In the Forward of this Handbook, the following was found: "The best way to eliminate hazards is to design foolproof products. This is usually not possible. People have defeated designer's best efforts at fail-safe design. In many cases it is necessary to warn people about potential hazards."

For those hazards which have not been eliminated or guarded and remain in the product, the manufacturer must develop effective warnings and training instructions to prompt consumers into understanding and avoiding the dangers. Once again the buck stops with the manufacturer when it comes to warnings and instructional material so that the user is informed to the extent required so as to be able to be aware of, recognize, and avoid the hazards.

In a safety analysis, the manufacturer should, in order of the effect on safety: (1) strive to eliminate the hazard, (2) failing 1, securely enclose the hazard by housing, (guard). (3) Failing 1 and 2, the manufacturer must provide proper notification to alert users of the inherent dangers in the product and inform them how to avoid them (See, Standard Handbook of Machine Design, Second Edition, McGraw Hill). With regard to (3), the ANSI standard Z535, STANDARD for PRODUCT SAFETY and LABLES, indicated that an adequate warning includes a SIGNAL WORD, a statement identifying the HAZARD, instruction on how to avoid the hazard and a statement of the consequences of failing to avoid the hazard.

"Products should be reasonably safe during (1) normal use; (2) normal service, maintenance, and adjustment; (3) foreseeable uses for which the product is not intended; and (4) reasonably foreseeable misuse." ".....a manufacturer has a duty to warn customers about any reasonably foreseeable use of a product beyond the purpose for

which it was designed. For a warning to be considered adequate, it must advise the user of the following: 1. hazards involved in the product's use; 2. how to avoid these hazards; and 3. possible consequences of failing to heed these warnings. See chapter 9, PRODUCT SAFETY MANAGEMENT, ACCIDENT PREVENTION MANUAL for BUSINESS & INDUSTRY, National Safety Council.

Conducting a Product Safety Management (PSM) program audit (See page 209, ACCIDENT PREVENTION MANUAL, National Safety Council) creates a measurement to test the effectiveness of a company's success or lack thereof in realizing safety in the products they produce. The purpose of a PSM program is to develop a means to perform first, an evaluation of the product during design and manufacture, distribution, sale, and consumer use, and second, to control any accident and hazard potential through good product safety management techniques.

The major goal of the program audit is to reduce or eliminate the causes of product liability exposure (hazards). Some of these causes are: unreasonable marketing demands; unqualified designers or engineers; faulty engineering design logic; unsafe product designs; failure to identify foreseeable hazards in the product; failure to review product design safety; failure to optimize the selected solution intended to eliminate or secure identified hazards; inadequate manufacturing and quality assurance procedures; inadequate preparation and review of consumer warnings and instructions; misleading representation of product or services.

An effective design review requires that those individuals executing the safety analysis comprehensively searches out all sources of hazards, both the exposed and unexposed, as well as the obvious and not so obvious. The manufacturer must, while integrating the hazards with the foreseeable consumer environment and use, employ skillful foresight to identify those conditions under which injury-causing mechanisms can result. Analysis of the environment, where the product will foreseeably be used, is critical in determining how the product can foreseeably be used or operated, even if it is not the use intended by the manufacturer. (See: STANDARD HANDBOOK of MACHINE DESIGN, 2nd Ed. Chapter 10; SAFETY).

The manufacturer must follow after-sale use of the product and safety performance and take action to correct safety hazards where indicated; including any lack of adequacy in labeling, warnings, and safety information. Once the product is distributed to consumers, a responsible manufacturer must determine where injuries can occur, or if a product defect could create injuries. When corrective measures are needed, in order to eliminate further injuries, consumer notification must be provided in an effort to save consumers otherwise unaware of such safety issues. (See: STANDARD HANDBOOK of MACHINE DESIGN, 2nd Ed. Chapter 10; SAFETY).

When it comes to the elimination of product hazards, the buck stops with the manufacturer who alone is in a position to identify and eliminate them. Hazards which cannot be eliminated must be enclosed in a foolproof manner which of itself does not form a subsequent hazard; And, the users must be fully informed of the dangers inherent

in the product, and to motivate them to avoid those dangers posed by the hazards which cannot otherwise be eliminated or safely enclosed (guarded). (See: STANDARD HANDBOOK of MACHINE DESIGN, 2nd Ed. Chapter 10; SAFETY).

Part of the design process and the development of a product are the evaluation and analysis of the product hazards (See, Formal Methods of Hazard Analysis, page 241, ACCIDENT PREVENTION MANUAL, National Safety Council,); this is an obligation for any manufacturer. The purpose of the product hazard analysis is to determine that the product is free from hazardous defects and reasonably safe when the consumer is exposed to it. In that the product may not be safe, the objective of the hazard analysis is to identify and deal safely with the product's hazards.

The idea of the safety analysis is not new to engineers and manufacturers; however, even if conducted they are not always effective and results can vary. Therefore, in order to execute an effective safety analysis there should be an established written corporate safety policy related to product design and development. This policy must stress the importance of safety and provide the bases for the uniform and effective implementation of the policy among all company individuals and those involved in its execution. The presence of a hazard within a product results in the intrinsic capability of the product to cause harm and must be identified by the manufacturer. The unsecured danger of a hazard to those exposed to the product must be evaluated. Elimination of any unreasonable danger is the objective.

For reference, the following were excerpted from 29CFR (OSHA) Sections:
1910.212(a) Machine guarding.
1910.212(a)(1) Types of guarding. One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, ingoing nip points, rotating parts, flying chips and sparks. Examples of guarding methods are-barrier guards, two-hand tripping devices, electronic safety devices, etc.
1910.212(a)(2) General requirements for machine guards. Guards shall be affixed to the machine where possible and secured elsewhere if for any reason attachment to the machine is not possible. The guard shall be such that it does not offer an accident hazard in itself.
1910.212(a)(3) Point of operation guarding.
1910.212(a)(3)(i) Point of operation is the area on a machine where work is actually performed upon the material being processed.
..And, CFR 1910.212(a)(3)(ii)
1910.212(a)(3)(ii) The point of operation of machines whose operation exposes an employee to injury, shall be guarded. The guarding device shall be in conformity with any appropriate standards therefore, or, in the absence of applicable specific standards, shall be so designed and constructed as to prevent the operator from having any part of his body in the danger zone during the operating cycle.

A company employee, as mandated by law, must be provided with all necessary training to safely do their assigned job, (See (OSHA) 29 CFR, part 1926.21 SAFETY

TRAINING and EDUCATION). In the subject instance involving a washing machine, the general public, unlike an employee in a work setting, is not provided with nor assumed to have specialized safety training in the use and operation of the involved machine. The referenced HANDBOOK of MACHINE DESIGN, page 10.2, section, 10.3, HAZARD, RISK, AND DANGER, reads in part, "Risk (probability of exposure) is obviously much higher with a consumer product than with an industrial product to be used by trained workers in a shop environment." Therefore, consumer products such as washing machines must be designed and manufactured so that they are intrinsically safe for use by those members of the household-public environment likely to come in contact with the machine. When in the process of creating a design for a product and the product itself for use by the general public, it is to the interest of all parties that the machine be safe and not present hazards.

The ANSI/ASME B 15.1 – 1984/1986 SAFETY STANDARD for MECHANICAL POWER TRANSMISSION APPARATUS, reads, in part, in Section 3.1, GENERAL REQUIREMENTS, as follows: "All motion hazards associated with the operation of mechanical power transmission apparatus shall be eliminated by design of the equipment or protection by a guard, device, safe distance, or safe location." Section 3.2, TYPES of SAFEGUARDS: "All motion hazards shall meet the following requirements. (a) They shall prevent entry of hand, fingers, or other parts of the body into a point of hazard by reaching through, over, under, or around the guard. (b) They shall, in themselves, create no additional motion hazard between the guard and the moving parts. (c) They shall utilize fasteners not readily removable by people other than authorized persons. (Fasteners requiring hand tools) (d) If openings are provided for lubrication, adjustment, or inspection, they shall not cause any additional hazard. (e) The safeguard shall prevent injury from breakage of any of the component parts."

Figure 14 of the above Standard, B15.1, presents the reader with certain RECOMMENDED SAFEGUARDING DIMENSIONS. The information on Fig. 14 essentially gives dimensions of the idealized human hand with respect to safe dimensions of openings in guards as related to the distance to the guarded hazard. For an opening 0.369 inches by 1.641 inches through the top panel-guard of the subject machine, the switch arm operator of the interlock device required, for a safe distance to prevent human contact, about 2-1/2 inches distant from and below the surface plane of the top panel-guard opening. As noted above, the switch, with the selector at spin, was caused to power the spindle and drum at high speed when depressed below the top surface of the panel-guard to a dimension of 0.704 inches. A comparison to the safe distance (above) of 2-1/2 inches, it was evident that the 0.0704 inch configuration was about 1/3rd of what it should have been. From this evaluation, it was evident that the switch was subject to manual operation because a digit could, according to B 15.1, be passed through the opening to a distance sufficient to fire the spin-cycle switch when the lid-guard was open and the spindle hazard exposed.

Underwriters Laboratories, UL560, STANDARD for SAFETY, ELECTRIC HOME LAUNDRY EQUIPMENT, for editions, or revisions, marked as: 1955, 1961, and 1968 contain the following significant text, among other data: "It is recommended that any

washing machine having a means of water extraction of the centrifugal type be provided with an interlock which will *positively* prevent the operation of the centrifuge when its cover is not in the closed position." (Emphases added)

Underwriters Laboratories, UL560, STANDARD for SAFETY, ELECTRIC HOME LAUNDRY EQUIPMENT, for editions, or revisions, marked as 1969, contain the following significant text, among other data: "A washing machine provided with a means of water extraction of the centrifugal type shall: (A.) Be provided with a means to prevent opening of the load or door while the appliance is in the spin portion of the cycle, or (B.) Opening of the lid or door to a maximum of 2 inches of opening while in the spin portion of the cycle shall operate an interlock that removes the driving force from the basket and stops the movement of all accessible parts within 7 seconds with the appliance loaded as prescribed in paragraph 52.2." Subsequently the text continued as follows, (244B) "If an interlock provided on a top-load type washing machine is not recessed or guarded to prevent inadvertent operation when the lid is open, a secondary function control, manually operated from the outside of the machine, shall be provided."

Underwriters Laboratories, UL560, STANDARD for SAFETY, ELECTRIC HOME LAUNDRY EQUIPMENT, for editions, or revisions, marked as: 1971, 1972, 1975, contain the following significant text, among other data, similar to 1969 above with the following changes or additions: (244Aa) "Except as indicated in paragraph 244Ab, a top loading washer or a front-loading washer is considered to comply with item A in paragraph 244 if a deliberate action is required to deenergize (unlock) the lid locking mechanism. A deliberate action includes disconnecting the power supply cord, manually advancing the timer to the end of the complete cycle, pulling the timer knob "out," or manually rotating a rotary switch. In addition to deenergizing the lid locking mechanism, the "deliberate action" must completely stop the operation of the appliance. Pushing the timer knob "in," actuating a toggle switch, or actuating any type of push-to-operate switch is not considered a deliberate action." Underwriters Laboratories, UL560, STANDARD for SAFETY, ELECTRIC HOME LAUNDRY EQUIPMENT, for editions, or revisions, marked as 1980 and 1986 contain text, among other data, similar to 1971 through 1975 as indicated above.

These older U/L 560 standards recognized the motion hazard of the drum and spindle and the danger that an open lid subjected the user to. The lid was obviously considered a guard in the context of these standards. It was recognized that the lid was there for two reasons: (1) a guard to protect the user from the motion hazard of the spindle and drum when in operation; and (2) an access hatch to provide an opening in order to load and unload the machine. The latter editions of the U/L 560 Standard evidently were concerned with providing exceptions for certain events which were viewed as defeating to the interlock. With respect to the subject machine Model however, the text of the standard assumes the lid will be closed during spin and fails to address any condition wherein the lid was open at the spin cycle. Interestingly, the following part: "Pushing the timer knob "in," actuating a toggle switch, or *actuating any type of push-to-operate* switch is not considered a deliberate action," thus this excludes the depressing of the interlock switch as a "deliberate action" (Emphases added). The interlock switch

opening in the top panel guard of the subject washing machine was sufficient in size to have been considered a "push to operate switch."

OSHA, 29 CFR 1910.219(c) (4), reads, "*Projecting shaft ends.* (i) Projecting shaft ends shall present a smooth edge and end and shall not project more than one-half the diameter of the shaft unless guarded by nonrotating caps or safety sleeves." While not specifically enumerated in B 15.1, "projecting shaft ends" are well recognized as motion hazards which among other things tend to gather hair or fiber about them to devastating effect.

The risk of gathering fabric or hair about a rotating shaft-end is a function of shaft diameter and surface area. Binding occurs when a full wrap and more of the material such as hair or fabric is established about the circumference of a rotating shaft end. If the shaft end is kept short in relation to the diameter, the material has a superior opportunity to fall off the end of the shaft before a full wrap condition is achieved and catastrophe strikes. Circumference of a shaft is a function of the diameter, and the probability of a full wrap of the said material about a rotating shaft increases as the comparative diameter decreases. From this it is evident that small diameter and smaller circumference shaft ends are more hazardous than large ones for the same length of exposed shaft. Therefore, the shaft projection must be appropriately reduced in such a proportion as will ensure a sufficient counter effect to the increasing probability caused by the smaller shaft diameter and circumference.

It is significant to point out that the above ratio of the projection dimension of "one-half the diameter of the shaft," produces circumferential shaft surface area which decreases geometrically as the shaft diameter decreases. As an example, from OSHA above, the exposed surface area of a 2 inch diameter shaft is about one quarter of that of a proper 4 inch diameter shaft, one sixteenth the area of that of an approved 4 inch diameter shaft, and so on. The effect is that cutting the diameter of the shaft by half reduces the surface area by 4 times.

The vertical projecting spindle stem or shaft of the subject washing machine projected from the bottom of the drum to a height of 3-1/4 inches from the top panel of the machine. The cap-piece on top of the spindle measured about 2-1/4 inches in horizontal diameter and contained several axial grooves in its exterior circumferential surface. Below the cap-piece at about the same outside diameter were found the upper beginning vanes of the agitator. The height of the cap along with the minor diameter section of the vanes represented a length of several times the diameters of the cap-piece (2-1/4"). As a result of these facts it was evident that the principles related above, by B 15.1 and OSHA, were not applied to create a safe design. The stem design of the subject agitator represented a serious hazard when in motion and if exposed, such as, with the lid-guard open in the spin cycle as well as when in the agitation cycle.

An evaluation of the design logic and operation of the subject machine controls and lid lock system reflected the following understandings:

- The timer control dial cycle selector was also a push-pull type of off-on switch and could be manually rotated to any point on the dial.
- The lid was not secured by the lid latch mechanism regardless of the selector dial position while not under power; such as when the control switch was in the off position.
- The lid could be manually opened from the closed position at any time other then when the washing machine was actually engaged in a clothes-washing cycle and the timer-control set to and within the spin sector of the cycle and under power.
- With the exception of the above, the lid had no potential to be locked or supervised open or closed at any position of the timer-control.
- The design of the control system did not require full cycle operation from any fixed start point to a finish point.
- The timer control functioned to advance to the end (finish) point from all operational points on the selector from which the start switch was activated.
- The machine electrical circuits could be powered up while the selector was in the spin cycle with the lid closed or with it open.
- The lid latch switch was, as noted, physically unguarded when the lid was open and electrically unguarded as well; similarly, with the selector switch on and at spin nothing other than the lid latch switch was preventing operation in spin.
- When the start control switch was operated from on to off, the lid could be opened regardless of the position of the control dial.
- As a result of the previous entry, the machine could be stopped while in mid-spin cycle, and subsequently the lid could be opened, according to the manufacturer's operating instructions (FWX445NB).
- The subject washer as designed would operate in the agitation cycle whenever called for by the machine control without respect to the position of the lid-guard whether it was open or closed.

The following conclusions were drawn from an assessment of the above: (1) nothing about the machine's mechanical or electrical systems actually proved the closed or open position of the lid-guard, and this is a defect; (2) this fact of the design and access to the unguarded interlock switch dictated that the so-called interlock mechanism was operational with the lid open or with the lid closed, and the interlock did not distinguish the critical difference; (3) the spindle and drum could be powered with the lid open which would expose motion hazards and create a risk condition and danger of severe injury or death to a user.

When in a common washing process, the machine's on/off and cycle selector dial and cycle timer would progress from start to completion of the total wash cycle only if the lid of the washer was closed into a position. Should the lid be opened and left to rest there during any agitation part of the cycle, the machine would continue to operate in the agitation mode. As this agitation operation is taking place, the timer will progress until a position is reached in the sequence wherein the machine operating program is calling for a spin cycle to begin. As fallaciously envisioned by its designers, because the lid-guard of the machine was raised the machine would stop and cease operation until the interlock switch was depressed by the plastic operator attached to the cover when the lid

was again lowered into the closed position.

It is well known and understood by the engineering profession and the manufacturer knew or should have known that this is not correct as the machine can operate and the drum spindle will rotate under power and at high speed in the spin cycle even while the lid is other than closed and with the plastic operator disengaged from the interlock switch operator. Only one condition needed to be met for the spin cycle to go into high speed operation with the lid open. That condition being the activation of the interlock switch, which evidently occurred here. It is factually unknown as to how this was caused in the subject instance; it is understood that many possibilities exist.

The lid was at all times structurally suitable as a guard for the hazard of the spindle as well as the drum. A fatal flaw in the subject design concept was that the manufacture elected to configure the guard system so that it was a guard sometimes and not a guard at other times with the machine powered up. In both instances, when it was a guard and when it wasn't, there was always present the hazard of the powered spindle which required guarding. (See, B 15.1 including Figure 14)

In operation, the metal strip or key of the subject interlock was moved horizontally by electrical energy and, based on a faulty assumption, the designer's intension was for it to slip through an opening in the plastic interlock operator attached to the lid when the lid was closed and thereby secure the lid closed. No sensory element was provided in the design of the machine to prove that the key was actually within the confines of the plastic operator, or that the plastic operator was in position. The design was therefore fatally flawed, and element of an extremely dangerous deadly hazard because of close proximity and access by adults and children. Logic wise, the interlock switch could only testify that it was switched on or switched off but could not in any case say why.

When the lid-guard was open the interlock/lid-guard system failed to protect the user whenever the machine was in operation (See, B 15.1, and UL 560). In addition, when the lid-guard was open, the spindle, drum, and interlock control switch were unguarded, and any object which fit through the breach in the top panel-guard of the machine would cause the spindle and drum to be powered whenever the selector switch power was on. While this is not the same kind of engineering condition as when a part of a properly conceived safety feature of a machine fails or comes apart and results in or exposes a hazard, however it is the same in effect and the result here was a hazard every bit as dangerous as those created in other ways. The latter was more dangerous in that it was insidious with no visual, auditory or other signal to the user that life threatening danger was present.

In the subject matter, the failure was one of logic, and that fallacious logic was applied to a design which caused a defect to be incorporated in the interlock/lid-guard system. That defect sponsored an always-present intrinsic trap, that of a hazardous condition, which was dangerous to the extent of producing injuries so severe as to result in death. What this all indicates is that because there was no systemic supervision of the lid position, the lid latch mechanism was not failsafe in design, and this represented

design defects which caused hazards. In order to have failed safe, the design required that the lid-guard be closed without fail; such that otherwise, with respect to the subject issue, the spin cycle could "positively" not in any way whatsoever be powered (See U/L 560).

Inasmuch as the machine was by design operational in the agitation mode while the lid-guard was raised, the machine was defective (1) because the spindle hazard was unguarded, and (2) because emergency access to the only machine off switch was inaccessible to the user being as it was positioned behind the raised lid. With the cycle selector control dial switch on and positioned at spin, electrical power was conducted to the interlock switch without regard to the cover position. Remarkably, the raised cover presented access to an operational control, the interlock switch, which should have been guarded and secured against any such access. With the lid-guard raised, the unsecured interlock switch presented access to a life threatening hazard scenario.

Some time ago, in light of the injuries to numerous children and adults, it became obvious to the enlightened engineer that the designer and manufacturer of the subject type and model top loading clothes washing machine had created a machine which contained several unsecured hazards which placed those in the user environment at risk and therefore in danger of serious injury. (For reference, see file material under: Blum, Carpenter, Vaughn, Muntell, LaBlanc, Mahar, Marchais, Gibson, Exclusa, Johnson, and Newcomb.) These issues each were understood to involve injury or worse, and many, if not all, relate, for whatever reason, to the exposure of the individual to hazardous power and motion energy sources of the spindle and drum area of the machine sufficient to cause severe and potentially life threatening injuries.

For perspective, there was a significant injury in the Newcomb matter due to the exposure of a child to an unguarded energy source; a motion hazard identified as the spindle which drives the drum and agitator (See, B 15.1). In the Young matter a death resulted from the exposure of a child to an unguarded energy source; a motion hazard identified as the same spindle which drives the drum. Both of these events were the result of the potential of a motion hazard being exposed whenever the washing machine lid was open. Only when the lid was closed, locked, and/or monitored preventing reopening, would the motion hazard of the spindle be guarded.

It is understood that as a result of a settlement agreement between the parties involved in the referenced Newcomb matter (an injury during the agitation mode) that the manufacturer of the subject type washer Model made certain stipulated engineering design changes. In any event, the manufacturer added a new separate and independent electrical interlock switch to prevent the agitation action of the washer when the washer lid-guard was positioned other than closed; this was a lid-guard position supervisory circuit.

It is also understood that operation of this new-design interlock switch had no effect on the spin cycle interlock circuitry or the position of the lid in that cycle. Significantly, with the lid in the open position, it continued to require but a single event for

the exposed spin cycle interlock switch to be easily activated and the drive system to be energized and the drum powered at high speed. See, Fred Pauk's (Young) Deposition Transcript, pages 102,103 & 104, dated December 15, 2005. According to Pauk, the manufacturer installed an additional switch and the purpose of this was to supervise the lid position in the agitation cycle but inexplicably not in the agitation cycle. This type of activity is described as suboptimization.

The machine was hazardous in the agitation cycle because the user was exposed, by the open lid, to the substantial energy delivered to the agitator through the spindle (See MEI – CHARLTON, INC. REPORT). And, the machine was hazardous to those exposed to the energy similarly being delivered by the spindle to the drum because the machine could operate in the spin cycle with the lid open as a result of a single event. That event was the depression of the interlock operator by any object compatible with the access opening in the top of the washing machine allowing access to the switch operator. As noted earlier, many common objects were compatible with the opening to the interlock switch. In addition to those referenced previously, they include buttons, screws, belt buckles, among other things, and, as substantiated by B 15.1, Figure 14, a finger on the hands of an adult or child.

When the lid was open the spindle and drum hazards were unguarded and the interlock switch operator was unguarded as well. One of the fatal flaws with this machine design was that the lid-guard and interlock design lacked functional supervision of the lid. And, what was missing from the design that would have made the interlock fully effective was supervision by the proper electrical controls of the lid-guard and interlock switch such that no spin cycle could be powered up with the lid in any position other than closed.

International Standard CEI IEC 1160, Formal Design Review, indicated that a Formal Design Review process objective is to: "... ensure that products or services satisfy specified dependability, life, safety, endurance, environmental, electromagnetic compatibility, and performance requirements at a minimum cost and are deliverable within a prescribed schedule." And, on (IEC) page 53, Section 10.2.9, HUMAN FACTORS, it reads, among other things: "The human factors specialist should focus upon the following areas: .....adequacy and suitability of warnings and instructions for operation, installation, maintenance, assembly and disposal" (and) ..."accessibility of product controls."

In consideration the subject of HUMAN FACTORS, and the last item above, accessibility of product controls, it is significant that the subject machine was designed so as to present to the user "access" to what amounted to, but what should not have been, a "product control", the lid interlock switch. The design was defective as this interlock switch was a power control and should not have been configured so that operation was available to the user or accessible by any ordinary means. The lid

interlock system control was defective because such operation of the interlock control by a user released dangerous energy of motion in the form of the rotating spindle hazard.

The subject lid-guard interlock system was a defectively conceived and executed system which reportedly had been in production with the subject type washing machine for many years and the defects should have been eliminated long ago. That notwithstanding, with respect to warnings, a review of the subject product finds that no applicable warnings were provided for any defects or unguarded hazards noted in this supplemental report.

The fact that there were unguarded hazards, accompanied by risks and danger to the washing machine user, the machine was defective not only for those reasons but also because the manufacturer failed to notify the user of their existence at all in any manner. Secondly, properly designed and placed warnings were required. The spindle, drum, and washload, if exposed when in operation, were hazardous to the point of resulting in death. As such, there should have been warning(s) posted on the machine in full view and unavoidable to the machine user's observance that severe injury or death could result from involvement with the spindle, drum or washload while the machine was in operation; that at no time should the machine be operated while the lid was raised; and that at no time should washload product be added to or taken from the washer while it was in operation. The defective interlock switch design required fixing as noted, a warning in the area of the switch opening in the top panel guard of the machine should have been posted notifying the user not to insert fingers or objects into the opening and that doing so could release dangerous energy and result severe injury.

Three special words are commonly used to attract attention of the user:

- *Danger* is used when the hazard is such that severe injury or death will occur immediately upon contact with the hazard source.
- *Warning* is used when the hazard is such that moderate injury will occur immediately or that severe injury or death may eventually result from contact with the hazard source.
- *Caution* is used when the hazard is such that minor injuries will occur immediately or that moderate injury may eventually result from contact with the hazard source.

See ENGINEERING DESIGN FOR SAFETY, by Hunter, McGraw Hill; PRODUCT SAFETY LABEL HANDBOOK, "DANGER WARNING CAUTION" by Westinghouse Electric Corporation, 1985; ANSI Z 535.4 Product Safety Signs and Labels, sets the requirements for wording and colors to be used.

The 1989 National Safety Council Product Safety Management Guidelines presented the hierarchy of safety management. The reasonably prudent manufacturer must first eliminate the hazard, or if that is not feasible, to guard the hazard to prevent injury. Finally, after applying all possible safety measures to eliminate or guard, the National Safety Council indicated that companies should provide warnings for all

remaining hazards in the product.

From Product Safety Management, the National Safety Council's ACIDENT PREVENTION MANUAL:

- Warnings must clearly describe the possible consequences posed by a hazard.
- Warnings must clearly and understandably inform the user what to do or what not to do to avoid injury when avoidance procedures are not obvious.
- Warnings must identify all hazards that are not obvious.

Clearly the subject manufacturer failed to follow the National Safety Council Guidelines for the presentation of warning material on this washing machine.

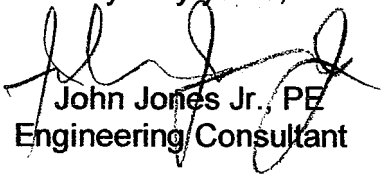
Electrolux had clear knowledge of the hazard and they knew how to fix it. Yet Electrolux failed to apply adequate safety measures to substantially reduce or eliminate the danger under foreseeable conditions of use. Electrolux had the responsibility to fully and completely warn users of the danger. Yet they failed to provide those adequate warnings to users of this model washing machine. Electrolux failed to act as a reasonably prudent manufacturer to adequately protect the user and those coming into contact with the machine while under power from the catastrophic risks of injury associated with the foreseeable use of the XCO4603122 washing machine.

The writer's opinions contained in this report were presented to a reasonable degree of engineering certainty and were based upon the present understanding of the facts, file materials, standards, and references reviewed, the March 14, 2003, site inspection, the writer's education, engineering, design, manufacturing, management, maintenance experience, the April 28, 2003, report, and the foregoing.

It is the writer's concluding opinion that the inspected machine was of inadequate design and, as manufactured, not in accordance with recognized and established engineering practice, and it was unreasonably hazardous for the intended consumer use and lacked certain features required for its safe operation including appropriate and adequate warnings related to the interlock design utilized.

The Jones report of April 28, 2003 is reaffirmed here as though set down at length. This is a supplemental report and as additional information may become available in the future; a further supplement may then be indicated. In the interim, if further assistance is required or questions arise, please contact the undersigned at your convenience. Thank you.

Very truly yours,



John Jones Jr., PE
Engineering Consultant

SOUTH ESSEX ENGINEERING

Engineering Consultants

13 S. Burgee Dr. Little Egg Harbor, New Jersey 08087
CELL PHONE: 609 - 713 - 1878

May 8, 2007

Law Offices of
Frank Zazzaro
39 S. Fullerton Avenue
Montclair, New Jersey 07042

Attention: Bridgett Saro, Esq.

COPY

Re: Deshaw Young
South Essex Engineering File No.:1339-03

Dear Ms. Saro:

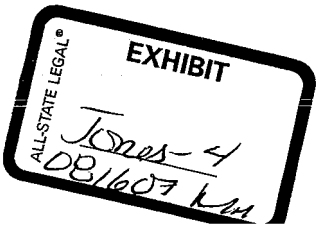
In accordance with your request, an inspection was conducted of an AMANA HEAVY DUTY WASHER located at 2520 Greenbriar Dr. Delray Beach, Florida. More fully definitive details regarding this machine model and serial number were not found. One set of photographs numbered 1-A through 21-A, taken during the inspection, are provided here for information and reference.

The subject machine was a conventional top loading floor standing unit of a common layout with manual controls located on a panel affixed to the rear of the top surface of the machine. A hinged nominally square-form horizontal service cover was provided and rotated up and to the rear of the machine for access to an interior wash chamber, drum, and spindle.

During the inspection, testing of the machine operation revealed that the machine drum and spindle power was cut at any point in its machine washing cycle when the lid was raised from the horizontal on its hinges about 1-1/2 inches at the front edge from the fully closed position. In addition, with the power to the drum thus cut off, the drum was slowed to a halt within a short time by an intrinsic breaking system.

Inasmuch as the raising of the lid caused the above actions, it was evident that there was an interlock; a device or devices connected to the lid, or related to the lid movements, which signaled these actions. Securing fasteners were removed to permit access to the machine innards behind the machine front and top panel.

Subsequently, it was observed that there existed a mechanical connection, communicating via the right side lid hinge, between the subject lid system and a mechanism containing a limit switch which was providing the referenced signal to the machine operational controls.



Unlike the machine involved in the Young matter, on the inspected Amana machine there was no simple access to this interlock mechanism or to the switch contained therein. As a result, being inaccessible by any exterior means, unwittingly over-riding the subject interlock was not reasonably available to a lay person without significantly altering the design of the machine.

The Jones reports of April 28, 2003 and April 12, 2006, are reaffirmed here as though set down at length. This is a supplemental report and as additional information may become available in the future; a further supplement may then be indicated. In the interim, if further assistance is required or questions arise, please contact the undersigned at your convenience. Thank you.

Very truly yours,

John Jones Jr., PE
Engineering Consultant